AMENDMENTS

CLAIMS

Please amend Claim 11 and add new Claims 32-48 as shown in the Listing of the Claims that follows. This Listing replaces all prior versions and listings of claims concerning the present Application.

LISTING OF THE (AMENDED) CLAIMS

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1. (Previously Presented) A method of encoding data stored in a storage device comprising:

generating a first polynomial whose roots comprise one or more powers of a primitive element of a Galois field, said first polynomial capable of being used to perform a first error correction of an encoded codeword, said first error correction correcting up to a first number of errors equal to one half the degree of said first polynomial;

generating a second polynomial whose roots comprise one or more powers of a primitive element of said Galois field, said second polynomial capable of being used to perform an error detection check of said encoded codeword; and

generating a product of said first polynomial and said second polynomial to yield a third polynomial, said third polynomial used to generate said encoded codeword, said third polynomial capable of being used to perform a second error correction of said encoded codeword, said second error correction correcting up to a second number of errors equal to one-half the degree of said third polynomial.

2. (Original) The method of Claim 1 wherein said one or more powers of a primitive element of said first polynomial comprise consecutive integer values.

3. (Original) The method of Claim 2 wherein the degree of said first polynomial equals 48.

4. (Original) The method of Claim 1 wherein said one or more powers of a primitive element of said second polynomial comprise consecutive integer values.

5. (Original) The method of Claim 1 wherein said storage device comprises a magnetic disk drive.

6. (Original) The method of Claim 4 wherein the degree of said second polynomial equals 4.

7. (Previously Presented) The method of Claim 1 further comprising dividing a fourth polynomial by said third polynomial to generate an encoded codeword, said fourth polynomial used to represent a sector of data, said sector of data comprising a number of data symbols.

8. (Original) The method of Claim 7 wherein said symbols comprise 10 bit symbols.

~~9. (Original) The method of Claim 8 wherein said encoded codeword comprises a maximum of 1023 symbols.~~

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~~10. (Previously Presented) The method of Claim 7 further comprising writing said encoded codeword onto a media residing in said storage device.~~

11. (Currently Amended) A method of encoding data stored in a storage device comprising:

generating a first polynomial whose roots comprise one or more powers of a primitive element of a Galois field;

generating a second polynomial whose roots comprise one or more powers of a primitive element of said Galois field;

generating a product of said first polynomial and said second polynomial;

dividing a third polynomial by said product to generate an encoded codeword, said third polynomial used to represent a sector of data, said sector of data comprising a number of symbols;

writing said encoded codeword onto a media ~~residing~~ of said storage device; and

decoding data stored in said storage device comprising:

reading said encoded codeword from said storage device;

performing a first division of said encoded codeword by said first polynomial;

determining whether a first remainder exists from said first division;

first correcting said encoded codeword using said first remainder;

performing a second division of said encoded codeword by said second polynomial;

determining whether a second remainder exists from said second division;

performing a third division of said encoded codeword by said product of said first and said second polynomials if said second remainder exists from said second division;

determining a third remainder from said third division; and

second correcting said encoded codeword using said third remainder.

12. (Original) The method of Claim 11 wherein said encoded codeword is generated by dividing a fourth polynomial by said product of said first and second polynomials, said fourth

polynomial having coefficients that represent one or more data symbols, said fourth polynomial defined over a Galois field.

13. (Original) The method of Claim 11 wherein one or more roots of said first polynomial are consecutive powers of a primitive element of said Galois field.

14. (Original) The method of Claim 13 wherein one or more roots of said second polynomial are consecutive powers of a primitive element of said Galois field.

15. (Original) The method of Claim 14 wherein each of said one or more roots of said first polynomial is not equal to each of said one or more roots of said second polynomial.

16. (Original) The method of Claim 15 wherein the first root of said one or more roots of said second polynomial has power that is consecutive to that of the last root of said one or more roots of said first polynomial.

17. (Original) The method of Claim 11 wherein said first correcting corrects a maximum number of symbol errors equal to one-half the degree of said first polynomial.

18. (Original) The method of Claim 11 wherein said second correcting corrects a maximum number of symbol errors equal to one-half the degree of said product of said first polynomial and said second polynomial.

19. (Original) A method of encoding and decoding data stored in a media of a storage device comprising:

generating a first polynomial whose roots comprise one or more consecutive powers of a primitive element of a Galois field;

generating a second polynomial whose roots comprise one or more consecutive powers of a primitive element of said Galois field;

generating a product of said first polynomial and said second polynomial;

performing a first division of a third polynomial by said product to generate a first remainder, said first remainder used to generate an encoded codeword, said third polynomial used to represent a sector of data, said sector of data comprising a number of data symbols;

writing said encoded codeword into said media of said storage device;

reading said encoded codeword from said storage device;

performing a second division of said encoded codeword by said first polynomial;

determining whether a second remainder exists from said second division;

correcting said encoded codeword using said second remainder;

performing a third division of said encoded codeword by said second polynomial;

determining whether a third remainder exists from said third division;

performing a fourth division of said encoded codeword by a product of said first and said second polynomials if said third remainder exists from said third division;

determining a fourth remainder from said fourth division; and

correcting said encoded codeword using said fourth remainder.

20. (Original) The method of Claim 19 wherein said first polynomial is of degree 48.

21. (Original) The method of Claim 19 wherein said second polynomial is of degree 4.

22. (Original) The method of Claim 19 wherein said symbols comprise 10 bits.

23. (Original) The method of Claim 22 wherein said encoded codeword comprises a maximum length of 1023 symbols.

24. (Original) The method of Claim 19 wherein said encoding and decoding is implemented by way of Reed-Solomon codes.

25. (Original) The method of Claim 19 wherein said storage device comprises a magnetic disk drive.

~~26. (Previously Presented) A system to effectively correct and detect errors in a media of a storage device comprising:~~

~~an encoder for generating an encoded codeword that is written onto said media of said storage device; and~~

~~a decoder for decoding said encoded codeword that is read from said media of said storage device using at least two processing stages of error correction, wherein a first of said two processing stages is used to correct up to a first number of errors in said encoded codeword, and a second of said two processing stages is used to correct up to a sum of said first number plus a second number of errors in said encoded codeword, said first number corresponding to one-half the degree of a first polynomial, said second number corresponding to one-half the degree of a second polynomial.~~

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~~27. (Original) The system of Claim 26 further comprising:~~

~~a memory; and~~

/SMB/ ~~a set of instructions resident in said memory capable of implementing one or more algorithms used in said encoding and decoding of said data.~~

28-29. (Cancelled)

~~30. (Original) The system of Claim 26 wherein said encoder and said decoder utilizes a Reed-Solomon algorithm.~~

~~31. (Previously Presented) The system of Claim 26 wherein roots of said first polynomial and said second polynomial comprise consecutive powers of a primitive element in a Galois field.~~

32. (New) A method of encoding data stored in a storage device comprising:

generating a first polynomial whose roots comprise one or more powers of a primitive element of a Galois field, said first polynomial capable of being used to perform a first error correction of an encoded codeword, said first error correction correcting up to a first number of errors equal to one-half the degree of said first polynomial;

generating a second polynomial whose roots comprise one or more powers of a primitive element of said Galois field, said second polynomial capable of being used to perform an error detection check of said encoded codeword; and

generating a product of said first polynomial and said second polynomial to yield a third polynomial, said third polynomial used to generate said encoded codeword, said third polynomial capable of being used to perform a second error correction of said encoded codeword, said second error correction correcting up to a second number of errors equal to one-half the degree of said third polynomial, wherein the degree of said first polynomial equals 48.

33. (New) A method of encoding data stored in a storage device comprising:

generating a first polynomial whose roots comprise one or more powers of a primitive element of a Galois field, said first polynomial capable of being used to perform a first error correction of an encoded codeword, said first error correction correcting up to a first number of errors equal to one-half the degree of said first polynomial;

generating a second polynomial whose roots comprise one or more powers of a primitive element of said Galois field, said second polynomial capable of being used to perform an error detection check of said encoded codeword; and

generating a product of said first polynomial and said second polynomial to yield a third polynomial, said third polynomial used to generate said encoded codeword, said third polynomial capable of being used to perform a second error correction of said encoded codeword, said second error correction correcting up to a second number of errors equal to one-half the degree of said third polynomial, wherein the degree of said second polynomial equals 4.

34. (New) A system comprising:

a storage device; and

an encoder / decoder subsystem used for:

generating a first polynomial whose roots comprise one or more powers of a primitive element of a Galois field;

generating a second polynomial whose roots comprise one or more powers of a primitive element of said Galois field;

generating a product of said first polynomial and said second polynomial;

dividing a third polynomial by said product to generate an encoded codeword, said third polynomial used to represent a sector of data, said sector of data comprising a number of symbols;

writing said encoded codeword onto a media of said storage device;

decoding data stored in said storage device comprising:

reading said encoded codeword from said storage device;

performing a first division of said encoded codeword by said first polynomial;

determining whether a first remainder exists from said first division;

first correcting said encoded codeword using said first remainder;

performing a second division of said encoded codeword by said second polynomial;

determining whether a second remainder exists from said second division;

performing a third division of said encoded codeword by said product of said first and said second polynomials if said second remainder exists from said second division;

determining a third remainder from said third division; and

second correcting said encoded codeword using said third remainder.

35. (New) The system of Claim 34 wherein said encoded codeword is generated by dividing a fourth polynomial by said product of said first and second polynomials, said fourth polynomial having coefficients that represent one or more data symbols, said fourth polynomial defined over a Galois field.

36. (New) The system of Claim 34 wherein one or more roots of said first polynomial are consecutive powers of a primitive element of said Galois field.

37. (New) The system of Claim 36 wherein one or more roots of said second polynomial are consecutive powers of a primitive element of said Galois field.

38. (New) The system of Claim 37 wherein each of said one or more roots of said first polynomial is not equal to each of said one or more roots of said second polynomial.

39. (New) The system of Claim 38 wherein the first root of said one or more roots of said second polynomial has power that is consecutive to that of the last root of said one or more roots of said first polynomial.

40. (New) The system of Claim 34 wherein said first correcting corrects a maximum number of symbol errors equal to one-half the degree of said first polynomial.

41. (New) The system of Claim 34 wherein said second correcting corrects a maximum number of symbol errors equal to one-half the degree of said product of said first polynomial and said second polynomial.

42. (New) A system comprising:

a storage device used for writing said encoded codeword onto a media of said storage device; and

an encoder / decoder subsystem used for:

generating a first polynomial whose roots comprise one or more consecutive powers of a primitive element of a Galois field;

generating a second polynomial whose roots comprise one or more consecutive powers of a primitive element of said Galois field;

generating a product of said first polynomial and said second polynomial;

performing a first division of a third polynomial by said product to generate a first remainder, said first remainder used to generate an encoded codeword, said third polynomial used to represent a sector of data, said sector of data comprising a number of data symbols;

writing said encoded codeword into said media of said storage device;

reading said encoded codeword from said storage device;

performing a second division of said encoded codeword by said first polynomial;

determining whether a second remainder exists from said second division;

correcting said encoded codeword using said second remainder;

performing a third division of said encoded codeword by said second polynomial;

determining whether a third remainder exists from said third division;

performing a fourth division of said encoded codeword by a product of said first and said second polynomials if said third remainder exists from said third division;

determining a fourth remainder from said fourth division; and

correcting said encoded codeword using said fourth remainder.

43. (New) The system of Claim 42 wherein said first polynomial is of degree 48.

44. (New) The system of Claim 42 wherein said second polynomial is of degree 4.

45. (New) The system of Claim 42 wherein said symbols comprise 10 bits.

46. (New) The system of Claim 42 wherein said encoded codeword comprises a maximum length of 1023 symbols.

47. (New) The system of Claim 42 wherein encoding and decoding of said codeword is implemented by way of Reed-Solomon codes.

48. (New) The system of Claim 42 wherein said storage device comprises a magnetic disk drive.